INDEX

A

ABRAMSON, STEVEN, see Giulia Celli, 317
ABRM, 206
Accessory heart, 386
Acid phosphatase, 110
Actions of FMRFamide-like peptides, 206
Activation of the octavolateralis efferent system in the lateral line of free-swimming toadfish, 326
Adipokinetic hormones: functions and structures, 218
Adrenocortical cells, 313
Aiptasia pallida, 130
AKH family, The, 218
Alcohol, 350
ALKON, DANIEL L., see James L. Olds, 325
ALKON, D. L., C. COLLIN, I. LEDERHENDLER, R. ETCHEBERIGARRAY, P. HUDDIE, M. SAKAKIBARA, S. REDLICH, E. YAMOAH, A. PAPAGEORGE, AND T. NELSON, Functional and structural consequences of activation of protein kinase C (PKC) and injection of G-protein substrates of PKC in *Hermissenda* neurons, 320
Amoeba cysts, 110
Amoebomastigote transformation, 110
Analysis of edge birefringence observed near refractive index steps in myofibrils and KCl crystals using high resolution polarized light microscopy and spatial Fourier filtering, 318
Annelids, 363
Annual Report of the Marine Biological Laboratory, 1
Anomia simplex, 83
Anomiid, 83
Anoxia, 154
Antarctic, 77
Anti-fertility agent, 316, 317
Arachidonate and docosahexanoate as messengers in stimulus-response-coupling: evidence for effects of G-proteins in marine sponge aggregation, 317
Arbacia differentiation, 317
ARMSTRONG, PETER B., see James P. Quigley, 316; and Frederick R. Rickles, 319
Arterial perfusion of FMRFamide-related peptides potentiate transmission at the giant synapse of the squid, 322
Arthropod neuropeptides, 225
Asterias rubens, 141
Asteroid larvae, 77
ATEMA, JELLE, GREG GERHARDT, PAUL MOORE, AND LAURENCE MADIN, Subnose 1: tracking oceanic odor plumes with high spatio-temporal resolution, 328
ATEMA, JELLE, see Kurt Kotrschal, 328; Paul Moore, 329; Robert C. Peters, 329; Nat Scholz, 329; Rainer Voigt, 330; and Anna Weinstein, 330
ATP-models, 313
AUGUSTINE, GEORGE J., see Luis R. Osses, 146
Autotrophic carbon fixation by the chemoautotrophic symbionts of *Riftia pachyptila,* 372

B

Bacterial aggregates within the epidermis of the sea anemone *Aiptasia pallida,* 130
Bacterial films, 295
Bacterial symbionts, 130
Bag cells, 210
BANDIVDEKAR, A. H., S. J. SEGAL, AND S. S. KOIDE, Binding of 5-hydroxytryptamine to isolated plasma membranes of *Spisula* gametes, 314
BARLOW, ROBERT B., AND EHUD KAPLAN, What is the origin of photoreceptor noise? 321
BARRY, SUSAN, R., see Luis R. Osses, 146
Bathyal echinoid sperm ultrastructure, 230
BELL, G. I., see D. F. Steiner, 172
BERG JR., CARL J., see Jeffry B. Mitton, 356; and Ronald L. Garthwaite, 287
BERGLES, DWIGHT E., AND SIDNEY L. TAMM, Cell motility and cytoskeleton, 313
BERLIN, ROBERT L., see James Y. Bradfield, 344
BERNAL, JUAN, AND BARBARA EHRLICH, G-proteins modulate calcium currents in *Paramecium* and *Helix* neurons, 321
Bilateral asymmetry in the shell morphology and micro-structure of early ontogenetic stages of *Anomia simplex,* 83
Binding of 5-hydroxytryptamine to isolated plasma membranes of *Spisula* gametes, 314
Binding of gossypol and its analog to sperm proteins from *Arbacia, Chaetopterus,* and *Spisula,* 317
Biochemistry, 247
Biphasic modulation of calcium-dependent potassium current in pituitary tumor cells examined with the perforated patch clamp technique, 323
Birefringence, 318
BISGROVE, BRENT W., see Annette L. Parks, 96
BLANKENSHIP, JAMES E., see Gregg T. Nagle, 210
Blood pressure, 328, 386
Bluefish, 328
Bombesin, 192
BORKOWSKI, ROSEMARIE, AND ROBERT A. BULLIS, Shell disease syndrome in *Cancer* crabs, 327
BOSCH, ISIDRO, Contrasting modes of reproduction in two Antarctic asteroids of the genus *Porania,* with a description of unusual feeding and non-feeding larval types, 77
BOYER, BARBARA C., AND GWENDOLYN A. WALLACE, Early cleavage and the role of the macromeres in the development of the polyclad flatworm *Hoploplana,* 315
BOYER, BARBARA C., see Ilene M. Kaplan, 327
BOYER, BARBARA CONTA, The role of the first quartet micromeres in the development of the polyclad *Hoploplana inquilina,* 338
BRADFIELD, JAMES Y., ROBERT L. BERLIN, SUSAN M. RANKIN, AND LARRY L. KEELEY, Cloned cDNA and antibody for an ovarian cortical granule polypeptide of the shrimp *Penaeus vannamei,* 344
Bryozoan growth and reproduction, 277
Bryozoan larvae and bacterial films, 295
Buccal muscle, 206
Bugula, 277, 295
BULLIS, ROBERT A., see Rosemarie Borkowski, 327
BULLIS, ROBERT A., Shell disease in impounded American lobsters, *Homarus americanus,* 327
Busycon, 327

C

Ca-sensitivity, 313
Ca^{2+} channel, 315

Calcification, 318
Calcification and proton transport in algae, 318
Calcium
  channel, 321, 323
  currents, 322
Calcium currents recorded in cells of anterior pituitary slices using the patch clamp technique, 322
Calcium-ATPase, 318
Calmidazolium, 319
Calsequestrin, 318
CAMERON, J. LANE, see Kevin J. Eckelbarger, 230
Cancer prevention, 317
Cancer spp., 327
Cardioregulation, 386
CARTA, CARL A., See Frederick R. Rickles, 319
Cell cycle, 316
Cell fusion induced by a radio-frequency electric field, 314
Cell motility and cytoskeleton, 313
CELLI, GIULIA, JONATHAN MCMENAMIN-BALANO, STEVEN ABRAMSON, KATHLEEN HAINES, JOANNA LESZCZINSKA, AND GERALD WEISSMANN, Arachidonate and docosahexanoate as messengers in stimulus-response-coupling: evidence for effects of G-proteins in marine sponge aggregation, 317
CELLI, GIULIA, see William Riesen, 319
Central control, 326
CHAN, S. J., see D. F. Steiner, 172
CHANG, DONALD C., AND QIANG ZHENG, Studies of membrane and cytoskeletal structures by electroporation using a radio-frequency electric field, 313
CHANG, DONALD C., see Qiang Zheng, 314
Chaos, 326
Chaotic properties of quantal transmission at the skate neuro-electrocyte junction, 326
Chemical orientation, 329
Chemo-orientation of the lobster, *Homarus americanus,* to a point source in a laboratory flume, 329
Chemoautotrophy, 372
Chemoreception, 329, 330
CHERKSEY, B., R. LLINAS, M. SUGIMORI, AND J.-W. LIN, Preliminary molecular structure of FTX and synthesis of analogs that block ICa in the squid giant synapse, 321
CHERKSEY, B., see R. Llinas, 324
CHILDRESS, JAMES J., see Charles R. Fisher, 372
Chitinoclasia, 327
Chlorinated hydrocarbons, 327
Cholecystokinin, 195
Choline acetyltransferase, 322
Chromatin bodies, 110
Chromatophores, 225
Chromidia, 110
Cilia, 320
Ciona cilia, 313
Ciona intestinalis, 317
Circulation, 328, 386
Cis-unsaturated fatty acid, 317
Cloned cDNA and antibody for an ovarian cortical granule polypeptide of the shrimp *Penaeus vannamei,* 344
Cnidaria, 130
Coagulation, 319
COHEN, A. I., see D. Schiminovich, 325
COHEN, L. B., see D. Schiminovich, 325
COLLIN, C., see D. L. Alkon, 320
Color change, 225
Comparative aspects of gossypol action, 316
Conch, 327
Consequences of dispersal, 277
Consistency and variability in peptide families: introduction, 167
Contrasting modes of reproduction in two Antarctic asteroids of the genus *Porania,* with a description of unusual feeding and nonfeeding larval types, 77
Copulatory behavior, 331
CORCORAN, GERALYN, see Walter Troll, 317
Corpora allata, 396
Cortical granule, 344
COTTRELL, G. A., E. STANLEY, M. SUGIMORI, J.-W. LIN, AND R. LLINAS, Arterial perfusion of FMRFamide-related peptides potentiate transmission at the giant synapse of the squid, 322
Crab, 247, 327
Crassostrea virginica, 154
Crustacea, 331, 344
Crustacean hormones, 225
Cryopreservation of spermatophores and seminal plasma of the edible crab *Scylla serrata,* 247
Cryoprotectant, 247
Cushing response, 328
Cytoplasmic localization, 338
Cytoskeleton, 313, 314

D

D'ALESSIO, GIUSEPPE, RENATA PICCOLI, AND NELLO RUSSO, Opioids in invertebrates, 317
DAPI, 110
Deep-sea reproduction, 230
Deletion of oncogenes, 317
DERIEMER, SUSAN A., MEYER B. JACKSON, AND ARTHUR KONNERTH, Calcium currents recorded in cells of anterior pituitary slices using the patch clamp technique, 322
Desiccation resistance, 110
Development, 77, 96
Development of trophosome in *Ridgeia* sp., 254
Digestive system, development in *Ridgeia* sp., 254
DIMALINE, RODNEY, see Michael C. Thorndyke, 183
Direct development in the sea urchin *Phyllacanthus parvispinus* (Cidaroidea): phylogenetic history and functional modification, 96
Disease, 327
Dispersal, 356
Dissoconch, 83
DNA repair, 320
DOCKRAY, G. J., Gastrin, cholecystokinin (CCK), and the leukosulfakinins, 195
Does calsequestrin facilitate calcium diffusion along the endoplasmic reticulum of eggs? 318
Dogfish shark and sea robin, 319
Dose-response for FTX blockade of presynaptic I (Ca) in the squid giant synapse, 324
DOWDALL, M., G. PAPPAS, AND M. KRIEBEL, Properties of detached nerve terminals from skate electric organ: a combined biochemical, morphological, and physiological study, 322
DREWES, C. D., AND C. R. FOURTNER, Hindsight and rapid escape in a freshwater oligochaete, 363
DUBOIS, ARTHUR B., see Stephen H. Fox, 328

E

Early cleavage and the role of the macromeres in the development of the polyclad flatworm *Hoploplana,* 315
Early development in *Ridgeia,* 254
EBBERINK, R. H. M., A. B. SMIT, AND J. VAN MINNEN, The insulin family: evolution of structure and function in vertebrates and invertebrates, 176
Echinoderm reproduction, 230
Echinoidea, 230
ECKELBARGER, KEVIN J., CRAIG M. YOUNG, AND J. LANE CAMERON, Modified sperm ultrastructure in four species of soft-bodied echinoids (Echinodermata: Echinothuriidae) from the bathyal zone of the deep sea, 230
Ecology and life history of an amoebomastigote, *Paratetramitus jugosus,* from a microbial mat: new evidence for multiple fission, 110
Effects of hypoxia and anoxia on survival, energy metabolism and feeding of oyster larvae (*Crassostrea virginica,* Gmelin), 154
Effects of GABA on retinal horizontal cells: evidence for an electrogenic uptake mechanism, The, 324

Efferent control of sensory processes, 324
Egg-laying hormone family: precursors, products, and functions, The, 210
EHRLICH, BARBARA, see Juan Bernal, 321
Elasmobranch, 324
Electric organ, 322, 324
Electric organ discharge and electrosensory reafference in the little skate, 324
Electrofusion, 313, 314
Electrophysiology, 329
Electroporation, 313, 314
Electroreception, 324
ELPHICK, MAURICE R., ROLAND H. EMSON, AND MICHAEL C. THORNDYKE, FMRFamide-like immunoreactivity in the nervous system of the starfish *Asterias rubens,* 141
Embryonic determination, 315
Embryonic symmetry, 314, 338
EMDIN, S., see D. F. Steiner, 172
EMSON, ROLAND H., see Maurice R. Elphick, 141
Encysting *Chlorella,* 110
Endocrinology, 323
Endoplasmic reticulum, 318
Endosymbiotic bacteria of *Ridgeia* sp. and *Riftia pachyptila,* 254
Endotoxin, 319
Energetics, 237
Energy imbalance in nonfeeding larvae, 237
Energy metabolism, 154
ENZIEN, MICHAEL, HEATHER I. MCKHANN, AND LYNN MARGULIS, Ecology and life history of an amoebomastigote, *Paratetramitus jugosus,* from a microbial mat: new evidence for multiple fission, 110
Epidermal chemoreception, 328
Escape reflex, 363
ETCHEBERIGARRAY, P., see D. L. Alkon, 320
Evolution, 176, 183
Evolution of peptide hormones of the islets of Langerhans and of mechanisms of proteolytic processing, 172

F

Facilitated diffusion, 318
Factors controlling attachment of bryozoan larvae: a comparison of bacterial films and unfilmed surfaces, 295
FALK, C. X., see D. Schiminovich, 325
FALKMER, S., see D. F. Steiner, 172
Feeding, 154
Female sexual receptivity associated with molting and differences in copulatory behavior among the three male morphs in *Paracerceis sculpta* (Crustacea: Isopoda), 331
FINK, RACHEL D., see Barbara E. Maclay, 316
FISHER, CHARLES R., JAMES J. CHILDRESS, AND ELIZABETH MINNICH, Autotrophic carbon fixation by the chemoautotrophic symbionts of *Riftia pachyptila,* 372
Fluorescent study of sensory neurons in normal and regenerating squid embryos, A 316
FMRFamide, 141, 322
FMRFamide-like immunoreactivity in the nervous system of the starfish *Asterias rubens,* 141
FMRFamide-related peptides, 206
FOURTNER, C. R., see C. D. Drewes, 363
FOX, STEPHEN H., CHRISTOPHER S. OGILVY, AND ARTHUR B. DUBOIS, Response of bluefish (*Pomatomus saltatrix*) to increased intracranial pressure (Cushing response), 328
FREADMAN, M. A., AND W. H. WATSON III, Gills as possible accessory circulatory pumps in *Limulus polyphemus,* 386
FTX, 323, 324
FTX blocks a calcium channel expressed by *Xenopus* oocytes after injection of rat brain mRNA, 323
FULLER, S. CYNTHIA, RICHARD A. LUTZ, AND YA-PING HU, Bilateral asymmetry in the shell morphology and micro-structure of early ontogenetic stages on *Anomia simplex,* 83
Functional and structural consequences of activation of protein kinase C (PKC) and injection of G-protein substrates of PKC in *Hermissenda* neurons, 320
Functions, receptors, and mechanisms of the FMRFamide-related peptides, 206
Fura II, 325

G

G-proteins modulate calcium currents in *Paramecium* and *Helix* neurons, 321
GABA, 324
GARDINER, STEPHEN L., see Meredith L. Jones, 254
GARTHWAITE, RONALD L., CARL J. BERG JR., AND JUNE HARRIGAN, Population genetics of the common squid *Loligo pealei* LeSueur, 1821, from Cape Cod to Cape Hatteras, 287
Gastrin, cholecystokinin (CCK), and the leukosulfakinins, 195
Gastrin-releasing peptide, 192
Gene flow, 356
Geographic variation, 356
GERHARDT, GREG, see Jelle Atema, 328
Germinal vesicle breakdown, 315
Giant axons of *Ridgeia* sp. and *Riftia pachyptila,* 254
Giant nerve fibers, 363
Giant-synapse, 322
Gill withdrawal reflex, 325
Gills as possible accessory circulatory pumps in *Limulus polyphemus,* 386
GLOGOWSKI, MARY ANN, see Edward E. Palincsar, 130
GNAIGER, ERICH, see William B. Stickle, 303
GOLDSWORTHY, GRAHAM, AND WILLIAM MORDUE, Adipokinetic hormones: functions and structures, 218
Gossypol, 316, 317
Gossypolone, 317
GREENBERG, MICHAEL J., AND MICHAEL C. THORNDYKE, Consistency and variability in peptide families: introduction, 167
GREENBERG, MICHAEL J., see David A. Price, 198
Growth and energy imbalance during the development of lecithotrophic molluscan larva (*Haliotis rufescens*), 237
Growth variation, 277

H

HADFIELD, MICHAEL G., see J. Timmothy Pennington, 350
HAINES, KATHLEEN, see Giulia Celli, 317
HARRIGAN, JUNE, see Ronald L. Garthwaite, 287
Heart muscle, 206
Heart-gill coordination, 386
HEFFLIN, BROCKTON, see George M. Langford, 313
Hemodynamics, 386
Hermissenda, 323
High resolution sampling, 328
Highspeed video, 325
HIGHSTEIN, STEPHEN M., see Rachel Locke, 324; and T. C. Tricas, 326
Hindsight and rapid escape in a freshwater oligochaete, 363
Hippocampus, 325
HOFFMANN, DANIELA, see Ilene M. Kaplan, 327
HOLZAPPLE, J., see J. Vautrin, 326
HOPP, H.-P., see D. Schiminovich, 325
Horizontal cells, 324
Horseshoe crab, 386
HU, YA-PING, see S. Cynthia Fuller, 83
HUDDIE, P., see D. L. Alkon, 320
Hunting of the FaRPs: the distribution of FMRFamide-related peptides, The, 198
Hydrothermal vents, 372
5-Hydroxytryptamine receptor types on *Spisula* gametes, 315
Hypoxia, 154

I

Identification of myosin in dogfish shark and sea robin lens epithelium, 319

Image analysis, 318
Imaging learning-specific changes in the distribution of protein kinase C, 325
Immunocytochemistry, 141, 323
Impermeant anions, 325
In vivo vectorial labeling of scallop gill ciliary membrane by NHS-LC-biotin, 320
INOUÉ, SHINYA, TED INOUÉ, ROBERT A. KNUDSON, AND RUDOLF OLDENBOURG, Very high resolution and dynamic stereo images of neurons, 322
INOUÉ, TED, see Shinya Inoué, 322
INOUE, SHINYA, see Rudolf Oldenbourg, 318
Insect
  neuropeptides, 218
  peptides, 176
Insulin, 172, 176
Insulin family: evolution of structure and function in vertebrates and invertebrates, The, 176
Interphase particulate tubulin revisited, 316
Intracranial pressure, 328
Invertebrates, 317
Involvement of Ca^{2+} channels in 5-hydroxytryptamine-induced oocyte maturation in *Spisula,* 315
Ion channels, 323
Islet peptides, 172
Isopoda, 331
Isozymes, 110

J

JACKSON, MEYER B., see Susan A. DeRiemer, 322
JAECKLE, WILLIAM B., AND DONAL T. MANAHAN, Growth and energy imbalance during the development of a lecithotrophic molluscan larva (*Haliotis rufescens*), 237
JAFFE, LIONEL F., Does calsequestrin facilitate calcium diffusion along the endoplasmic reticulum of eggs? 318
JEYALECTUMIE, C., AND T. SUBRAMONIAM, Cryopreservation of spermatophores and seminal plasma of the edible crab *Scylla serrata,* 247
JONES, MEREDITH L., AND STEPHEN L. GARDINER, On the early development of the vestimentiferan tube worm *Ridgeia* sp. and observations on the nervous system and trophosome of *Ridgeia* sp. and *Riftia pachyptila,* 254
JONES, WARREN R., see Edward E. Palincsar, 130
Juvenile hormone esterase, 396

K

KADAM, A. L., P. A. KADAM, S. J. SEGAL, AND S. S. KOIDE, Involvement of Ca^{2+} channels in 5-hydroxytryptamine-induced oocyte maturation in *Spisula,* 315
KADAM, A. L., see P. A. Kadam, 315
KADAM, P. A., A. L. KADAM, S. J. SEGAL, AND S. S. KOIDE, 5-hydroxytryptamine receptor types on *Spisula* gametes, 315
KADAM, P. A., see A. L. Kadam, 315
KAPLAN, EHUD, see Robert B. Barlow, 321
KAPLAN, ILENE M., BARBARA C. BOYER, AND DANIELA HOFFMANN, Marketing, ecological, and policy considerations related to the New England conch fishery and *Hoploplana,* 327
KAPPER, MARTIN A., see William B. Stickle, 303
KEELEY, LARRY, L., see James Y. Bradfield, 344
KEOUGH, MICHAEL J., Variation in growth rate and reproduction of the bryozoan *Bugula neritina,* 277
Kinetid, 110
Kinetosome, 110
KNUDSON, ROBERT A., see Shinya Inoué, 322
KOBAYASHI, MAKOTO, AND YOJIRO MUNEOKA, Functions, receptors, and mechanisms of the FMRFamide-related peptides, 206
KOIDE, S. S., see A. H. Bandivdekar, 314; A. L. Kadam, 315; and P. A. Kadam, 315
KONNERTH, ARTHUR, see Susan A. DeRiemer, 322
KOTRSCHAL, KURT, ROB PETERS, AND JELLE ATEMA, A novel chemosensory system in fish: do rocklings (*Ciliata mustela,* Gadidae) use their solitary chemoreceptor cells as fish detectors? 328
KOTRSCHAL, KURT, see Robert C. Peters, 329
KRAMER, RICHARD H., AND EDWIN S. LEVITAN, Biphasic modulation of calcium-dependent potassium current in pituitary tumor cells examined with the perforated patch clamp technique, 323
KRAUTGARTNER, WOLF-DIETRICH, see Robert C. Peters, 329
KRIEBEL, M., see J. Vautrin, 326; and M. Dowdall, 322
KUZIRIAN, ALAN M., see Ebenezer Yamoah, 323

L

Labyrinth, 326
LACOMIS, LYNNE, see Nat Scholz, 329; and Paul Moore, 329
LANGFORD, GEORGE M., SANDRA A. MURRAY, BROCKTON HEFFLIN, AND KATHLEEN J. PENNY, Quantitative motion analysis of vesicle movement in Y-1 adrenocortical cells and the use of fluorescent probes to identify the organelles, 313
Larvae, 154, 350
Larvae of a nudibranch mollusc (*Phestilla sibogae*) metamorphose when exposed to common organic solvents, 350
Larval
  development, 237
  settlement, 295
Learning, 320, 325
LEDERHENDLER, I., see D. L. Alkon, 320
Lens epithelium, 319, 320
LESZCZINSKA, JOANNA, see Giulia Celli, 317
Leukosulfakinins, 195
Leusine aminopeptidase, 110
LEVITAN, EDWIN, S., see Richard H. Kramer, 323
Ligand-receptor interactions, 319
Light scattering, 325
Limulus, 319, 386
LIN, J.-W., B. RUDY, AND R. LLINAS, FTX blocks a calcium channel expressed by *Xenopus* oocytes after injection of rat brain mRNA, 323
LIN, J.-W., see B. Cherksey, 321; G. A. Cottrell, 322; and R. Llinas, 324
LIU, LI-LIAN, see William B. Stickle, 303
LLINAS, R., M. SUGIMORI, J.-W. LIN, AND B. CHERKSEY, Dose-response for FTX blockade of presynaptic I (Ca) in the squid giant synapse, 324
LLINAS R., see B. Cherksey, 321; G. A. Cottrell, 322; J.-W. Lin, 323; and M. Sugimori, 326
Lobster, 327, 329, 330
LOCKE, RACHEL, AND STEPHEN M. HIGHSTEIN, Modulation of the spontaneous and evoked responses of lagenar afferents in the toadfish *Opsanus tau,* by electric pulse stimulation of the efferent vestibular nuclei, 324
Locusts, 218
Loligo pealei, 287
LOWE, KRIS, see Nancy S. Rafferty, 319; and Seymour Zigman, 320
LUTZ, RICHARD A., see S. Cynthia Fuller, 83
Lymnaea stagnalis, 176

M

MACLAY, BARBARA E., AND RACHEL D. FINK, A fluorescent study of sensory neurons in normal and regenerating squid embryos, 316
MADIN, LAURENCE, see Jelle Atema, 328
MAKI, J. S., D. RITTSCHOF, A. R. SCHMIDT, A. G. SNYDER, AND R. MITCHELL, Factors controlling attachment of bryozoan larvae: a comparison of bacterial films and unfilmed surfaces, 295
MALCHOW, ROBERT PAUL, The effects of GABA on retinal horizontal cells: evidence for an electrogenic uptake mechanism, 324
Male polymorphism, 331
MANAHAN, DONAL T., see William B. Jaeckle, 237
Manduca sexta, 396
MANN, R., see J. Widdows, 154

MARGULIS, LYNN, see Michael Enzien, 110
Marine policy, 327
Marketing, ecological, and policy considerations related to the New England conch fishery and *Hoploplana,* 327
Mastigote, 110
MASTRO, JOSEPH L., see Edward E. Palincsar, 130
MCCONNAUGHEY, TED, Calcification and proton transport in algae, 318
MCDONALD, JOHN K., see Sharon L. Milgram, 318
MCKHANN, HEATHER I., See Michael Enzien, 110
MCMENAMIN-BALANO, see Giulia Celli, 317; and William Riesen, 319
MCPHIE, DONNA L., see James L. Olds, 325
Meiosis, 316
Membrane 5-HT receptor, 314
Metabolic adaptations of several species of crustaceans and molluscs to hypoxia: tolerance and microcalorimetric studies, 303
Metalloproteinases of sea urchin embryo and sponge: detection by gelatin-substrate polyacrylamide gel electrophoresis, 316
Metamorphosis, 350
Microbial
  habitats, 110
  mats, 110
Microcoleus, 110
Microscopy, 322
MILGRAM, SHARON L., JOHN K. MCDONALD, AND BRYAN D. NOE, Regulation of insulin release from pancreatic islet cells by norepinephrine and neuropeptide Y, 318
VAN MINNEN, J., see R. H. M. Ebberink, 176
MINNICH, ELIZABETH, see Charles R. Fisher, 372
MITCHELL, R., see J. S. Maki, 295
Mithramycin, 110
MITTON, JEFFRY B., CARL J. BERG JR., AND KATHERINE S. ORR, Population structure, larval dispersal, and gene flow in the Queen conch, *Strombus gigas,* of the Caribbean, 356
Mixture suppression, 330
Modified sperm ultrastructure in four species of soft-bodied echinoids (Echinodermata: Echinothuriidae) from the bathyal zone of the deep sea, 230
Modulation of the spontaneous and evoked responses of lagenar afferents in the toadfish *Opsanus tau,* by electric pulse stimulation of the efferent vestibular nuclei, 324
Molecular cloning, 344
Mollusc, 206, 350
Molluscan
  egg-laying hormones, 210
  insulin-related peptide, 176
  neuropeptides, 210
  peptides, 176
Molting, 331
MOORE, PAUL, NAT SCHOLZ, LYNNE LACOMIS, AND JELLE ATEMA, Potential gradient information contained within the three-dimensional structure of a laboratory odor plume, 329
MOORE, PAUL, see Jelle Atema, 328; and Nat Scholz, 329
MORDUE, WILLIAM, see Graham Goldsworthy, 218
Morphology, 320
Mosaic development, 338
Mucoid stimuli, 329
Multiple fission, 110
MUNEOKA, YOJIRO, see Makoto Kobayashi, 206
MURRAY, SANDRA A., see George M. Langford, 313
Muscle, 318
Mychonastea desiccatus, 110
Myosin, 319

N

NAGLE, GREGG T., SHERRY D. PAINTER, AND JAMES E. BLANKENSHIP, The egg-laying hormone family: precursors, products, and functions, 210
Near-UV effects on the thymidine incorporation into dogfish lens, 320
Neisseria, 317
NELSON, LEONARD, The sperm cell's silent spring: herbicides and pesticides, 327
NELSON, T., see D. L. Alkon, 320
Nerve terminals, 325
Neurohormones, 176
Neurokinin 1 receptor, 192
Neurokinin 2 receptor, 192
Neurokinin A, 192
Neurokinin B, 192
Neurons, 322
Neuropeptide, 141, 183
Neuropeptide Y, 318
NEW, JOHN G., Electric organ discharge and electrosensory reafference in the little skate, 324
NEWELL, R. I. E., see J. Widdows, 154
Nicotinamide suppresses *Arbacia punctulata* development, 317
NOE, BRYAN D., see Sharon L. Milgram, 318
Noise, 321
Norepinephrine, 318
Novel chemosensory system in fish: do rocklings (*Ciliata mustela,* Gadidae) use their solitary chemoreceptor cells as fish detectors? A, 328
Novel chemosensory system in fish: electrophysiological evidence for mucus detection by solitary chemoreceptor cells in rocklings, A, 329
Nucleolus, 316

O

OBAID, A. L., K. STALEY, J. B. SHAMMASH, AND B. M. SALZBERG, Stilbene derivatives or chloride replacement by impermeant anion dramatically alter a late component of the light scattering change in mammalian nerve terminals, 325
Odor plume, 328, 329
OGILVY, CHRISTOPHER S., see Stephen H. Fox, 328
OLDENBOURG, RUDOLF, AND SHINYA INOUE, Analysis of edge birefringence observed near refractive index steps in myofibrils and KCl crystals using high resolution polarized light microscopy and spatial Fourier filtering, 318
OLDENBOURG, RUFOLF, see Shinya Inoué, 322
OLDS, JAMES L., DONNA L. MCPHIE, AND DANIEL L. ALKON, Imaging learning-specific changes in the distribution of protein kinase C, 325
On the early development of the vestimentiferan tube worm *Ridgeia* sp. and observations on the nervous system and trophosome of *Ridgeia* sp. and *Riftia pachyptila,* 254
On-line rapid determination of [Ca]i by means of Fura-II and high speed video imaging, 326
Ontogeny of serotonergic neurons in *Hermissenda:* a preliminary study, 323
Opioids in invertebrates, 317
Opsanus tau, 324
Optical recordings, 325
Organic solvents, 350
ORR, KATHERINE S., see Jeffry B. Mitton, 356
Osmotic artifacts, 314
OSSES, LUIS R., SUSAN R. BARRY, AND GEORGE J. AUGUSTINE, Protein kinase C activators enhance transmission at the squid giant synapse, 146
Ovarian protein, 344
Oxygen, 372
Oyster, 154

P

Paddle cilia occur as artifacts in veliger larvae of *Spisula solidissima* and *Lyrodus pedicellatus,* 314
PAINTER, SHERRY D., see Gregg T. Nagle, 210
PALINCSAR, EDWARD E., WARREN R. JONES, JOAN S. PALINCSAR, MARY ANN GLOGOWSKI, AND JOSEPH L. MASTRO, Bacterial aggregates within the epidermis of the sea anemone *Aiptasia pallida,* 130

PALINCSAR, JOAN S., see Edward E. Palincsar, 130
Pancreatic islets, 318
PAPAGEORGE, A., see D. L. Alkon, 320
PAPPAS, G., see M. Dowdall, 322
Paracerceis, 331
Paramecium, 321
Paratetramitus, 110
PARKS, ANNETTE L., BRENT W. BISGROVE, GREGORY A. WRAY, AND RUDOLF A. RAFF, Direct development in the sea urchin *Phyllacanthus parvispinus* (Cidaroidea): phylogenetic history and functional modification, 96
PENNINGTON, J. TIMOTHY, AND MICHAEL G. HADFIELD, Larvae of a nudibranch mollusc (*Phestilla sibogae*) metamorphose when exposed to common organic solvents, 350
PENNY, KATHLEEN J., see George M. Langford, 313
Peptide, 183
  families, 167, 210, 225
  structure, 218
  YY, 187
Peptide YY: the ileo-colonic, gastric, and pancreatic inhibitor, 187
PETERS, ROB, see Kurt Kotrschal, 328
PETERS, ROBERT C., KURT KOTRSCHAL, WOLF-DIETRICH KRAUTGARTNER, AND JELLE ATEMA, A novel chemosensory system in fish: electrophysiological evidence for mucus detection by solitary chemoreceptor cells in rocklings, 329
Phosphatidylinositol, 323
Photoreceptor, 321, 363
Photosynthesis, 318
Phyllacanthus parvispinus, 96
PICCOLI, RENATA, see Giuseppe D'Alessio, 317
Pigment dispersing hormone family: chemistry, structure-activity relations, and distribution, The, 225
Pituitary, 322
Polyclad, 315
Polyclad turbellaria, 338
Pomatomus saltatrix, 328
Population genetics of the common squid *Loligo pealei* LeSueur, 1821, from Cape Cod to Cape Hatteras, 287
Population structure, larval dispersal, and gene flow in the Queen conch, *Strombus gigas,* of the Caribbean, 356
Potential gradient information contained within the three-dimensional structure of a laboratory odor plume, 329
Potentiation, 322
Preliminary molecular structure of FTX and synthesis of analogs that block ICa in the squid giant synapse, 321
Presynaptic blockers, 321
PRICE, DAVID A., AND MICHAEL J. GREENBERG, The hunting of the FaRPs: the distribution of FMRFamide-related peptides, 198
Prodissoconch, 83
Prohormone processing, 172
Properties of detached nerve terminals from skate electric organ: a combined biochemical, morphological, and physiological study, 322
Propionyl esterase, 110
Protein 1 of *Neisseria,* 317
Protein kinase C, 146, 320, 325
Protein kinase C activators enhance transmission at the squid giant synapse, 146
Protein phosphorylation, 146
Purkinje cell, 325

Q

Quanta, 322, 326
Quantitative motion analysis of vesicle movement in Y-1 adrenocortical cells and the use of fluorescent probes to identify the organelles, 313
Queen conch, 356
QUIGLEY, JAMES P., AND PETER B. ARMSTRONG, Metalloproteinases of sea urchin embryo and sponge: detection by gelatin-substrate polyacrylamide gel electrophoresis, 316
QUIGLEY, JAMES P., see Frederick R. Rickles, 319

R

Radial nerve cord, 141
RAFF, RUDOLF A., see Annette L. Parks, 96
RAFFERTY, KEEN A., see Nancy S. Rafferty, 319
RAFFERTY, NANCY S., KRIS LOWE, KEEN A. RAFFERTY, AND SEYMOUR ZIGMAN, Identification of myosin in dogfish shark and sea robin lens epithelium, 319
RAFFERTY, NANCY S., see Seymour Zigman, 320
RANKIN, SUSAN M., see James Y. Bradfield, 344
RAO, K. RANGA, AND JOHN P. RIEHM, The pigment dispersing hormone family: chemistry, structure-activity relations, and distribution, 225
Rat brain mRNA, 323
Receptor, 206
Receptor types, 315
REDLICH, S., see D. L. Alkon, 320
Regeneration, 316
Regulation of insulin release from pancreatic islet cells by norepinephrine and neuropeptide Y, 318
Reproduction, 96
Response of bluefish (*Pomatomus saltatrix*) to increased intracranial pressure (Cushing response), 328
Responses of chemoreceptor cells to controlled temporal stimulus patterns, 330
Retina, 324
Rhodopsin, 321
RICKLES, FREDRICK R., PETER B. ARMSTRONG, CARL A. CARTA, AND JAMES P. QUIGLEY, Spontaneous coagulation of *Limulus* amebocyte releasate in the absence of detectable endotoxin, 319
RIDDELL, JENNIFER H., see Michael C. Thorndyke, 183
Ridgeia sp., 254
RIEHM, JOHN P., see K. Ranga Rao, 225
RIESEN, WILLIAM, GIULIA CELLI, JONATHAN MCMENAMIN-BELANO, AND GERALD WEISSMANN, Secretion of *Microciona prolifera* aggregation factor (MAF) is required for marine sponge aggregation: quantitative analysis by means of a new assay for MAF, 319
Riftia pachyptila, 254
RITTSCHOF, S. D., see J. S. Maki, 295
Role of the first quartet micromeres in the development of the polyclad *Hoploplana inquilina,* The, 338
RUDY, B., see J.-W. Lin, 323
RUSSO, NELLO, see Giuseppe D'Alessio, 317

S

SAFRANEK, LOUIS, AND CARROLL M. WILLIAMS, Inactivation of the corpora allata in the final instar of the tobacco hornworm, *Manduca sexta,* requires integrity of certain neural pathways from the brain, 396
SAKAKIBARA, M., see D. L. Alkon, 320
SALZBERG, B. M., see A. L. Obaid, 325
Scallop, 320
SCHIMINOVICH, D., L. B. COHEN, A. I. COHEN, H.-P. HOPP, C. X. FALK, AND J.-Y. WU, A search for correlations in the spike activity of the *Aplysia* abdominal ganglion during the gill withdrawal reflex, 325
SCHMIDT, A. R., see J. S. Maki, 295
SCHOLZ, NAT, PAUL MOORE, LYNNE LACOMIS, AND JELLE ATEMA, Chemo-orientation of the lobster, *Homarus americanus,* to a point source in a laboratory flume, 329
SCHOLZ, NAT, see Paul Moore, 329
Scylla serrata, 247
Sea anemone, 130
Sea urchin, 96
Sea urchin morphogenesis, 316
Search for correlations in the spike activity of the *Aplysia* abdominal ganglion during the gill withdrawal reflex, A, 325
Secretion, 146
Secretion of *Microciona prolifera* aggregation factor (MAF) is required for marine spone aggregation: quantitative analysis by means of a new assay for MAF, 319

SEGAL, S. J., see A. H. Bandivdekar, 314; A. L. Kadam, 315; and H. Ueno, 317
SEGAL, SHELDON, AND HIROSHI UENO, Comparative aspects of gossypol action, 316
Seminal plasma, 247
Sensory adaptation, 330
Sensory neurons, 316
Seratonin, 314, 315, 323
Serotonin-sensitive K^+-channels, 206
Shadow response, 363
SHAMMASH, J. B., see A. L. Obaid, 325
Shell disease in impounded American lobsters, *Homarus americanus,* 327
Shell disease syndrome in *Cancer* crabs, 327
Shell
  microstructure, 83
  morphology, 83
SHORT, GRAHAM, AND SIDNEY TAMM, Paddle cilia occur as artifacts in veliger larvae of *Spisula solidissima* and *Lyrodus pedicellatus,* 314
Shrimp, 344
SHUSTER, STEPHEN M., Female sexual receptivity associated with molting and differences in copulatory behavior among the three male morphs in *Paracerceis sculpta* (Crustacea: Isopoda), 331
SMEEKENS, S. P., see D. F. Steiner, 172
SMIT, A. B., see R. H. M. Ebberink, 176
SNYDER, A. G., see J. S. Maki, 295
Spatial gradients, 329
Spectral tuning to amino acids and mixture effects on antennular chemoreceptor cells in the lobster, *Homarus americanus,* 330
Sperm cells silent spring: herbicides and pesticides, The, 327
Sperm
  motility, 315, 327
  ultrastructure, 230
Spermatophore, 247
Spider toxin, 321
Spike correlations, 325
Spisula
  gametes, 314
  oocytes, 315
Sponge cell reaggregation, 316
Spontaneous coagulation of *Limulus* amebocyte releasate in the absence of detectable endotoxin, 319
Squid, 287
  embryo, 316
  giant synapse, 324
STALEY, K., see A. L. Obaid, 325
STANLEY, E., see G. A. Cottrell, 322
Starfish, 141
STEINER, D. F., S. J. CHAN, S. P. SMEEKENS, G. I. GELL, S. EMDIN, AND S. FALKMER, Evolution of peptide hormones of the islets of Langerhans and of mechanisms of proteolytic processing, 172
STEPHENS, R. E., see L. Warren, 320
Stereoscopy, 322
STICKLE, WILLIAM B., MARTIN A. KAPPER, LI-LIAN LIU, ERICH GNAIGER, AND SHIAO Y. WANG, Metabolic adaptations of several species of crustaceans and molluscs to hypoxia: tolerance and microcalorimetric studies, 303
Stilbene derivatives or chloride replacement by impermeant anion dramatically alter a late component of the light scattering change in mammalian nerve terminals, 325
Stimulus-response coupling, 319
Stock structure, 287
Stratified microbial community, 110
Structure and behavior, 328
Studies of membrane and cytoskeletal structures by electroporation using a radio-frequency electric field, 313
Submersible, 328
Subnose I: tracking oceanic odor plumes with high spatiotemporal resolution, 328
SUBRAMONIAM, T., see C. Jeyalectumie, 247
Substance P, 192
SUGIMORI, M., AND R. LLINAS, On-line rapid determination of [Ca]i by means of Fura-II and high speed video imaging, 326
SUGIMORI, M., see B. Cherksey, 321; G. A. Cottrell, 322; R. Llinas, 324
Sulfide, 372
SUPRENANT, KATHY A., Interphase particulate tubulin revisited, 316
Survival, 154
Symbiosis, 130, 372
Synapse, 326
Synaptic transmission, 146

T

Tachykinins and the bombesin-related peptides: receptors and functions, 192
TAMM, SIDNEY L., see Dwight E. Bergles, 313; and Graham Short, 314
TAMSE, CATHERINE, see Ebenezer Yamoah, 323
Taste systems, 328
TAYLOR, IAN L., Peptide YY: the ileo-colonic, gastric, and pancreatic inhibitor, 187
Teleosts, 328
Thiocapsa, 110
THORNDYKE, MICHAEL C., JENNIFER, H. RIDDELL, DAVID T. THWAITES, AND RODNEY DIMALINE, Vasoactive intestinal polypeptide and its relatives: biochemistry, distribution, and functions, 183
THORNDYKE, MICHAEL C., see Maurice R. Elphick, 141; and Michael J. Greenberg, 167
THWAITES, DAVID T., see M. C. Thorndyke, 183
Toadfish, 324
Tobacco hornworm, 396
TRICAS, T. C., AND S. M. HIGHSTEIN, Activation of the octavolateralis efferent system in the lateral line of free-swimming toadfish, 326
Trochophore larva of *Ridgeia* sp., 254
TROLL, WALTER, AND GERALYN CORCORAN, Nicotinamide suppresses *Arbacia punctulata* development, 317
Trophosome of *Ridgeia* sp. and *Riftia pachyptila,* 254
Tubulin, 320

U

UENO, H., AND S. J. SEGAL, Binding of gossypol and its analog to sperm proteins from *Arbacia, Chaetopterus,* and *Spisula,* 317
UENO, HIROSHI, see Sheldon Segal, 316
Undulipodia, 110
Uptake, $45Ca^{2+}$, 315
UV radiation, 320

V

Variation in growth rate and reproduction of the bryozoan *Bugula neritina,* 277
Vasoactive intestinal polypeptide and its relatives: biochemistry, distribution, and functions, 183
VAUTRIN, J., J. HOLZAPPLE, AND M. KRIEBEL, Chaotic properties of quantal transmission at the skate neuro-electrocyte junction, 326
Veliger larvae, 314
Very high resolution and dynamic stereo images of neurons, 322
Vesicle movement, 313
Vestibular, 324, 326
Vestimentifera, 254, 372
Video microscopy, 313
VIGNA, STEVEN R., Tachykinins and the bombesin-related peptides: receptors and functions, 192
VIP and related peptides, 183
VOIGT, RAINER, AND JELLE ATEMA, Responses of chemoreceptor cells to controlled temporal stimulus patterns, 330
VOIGT, RAINER, see Anna Weinstein, 330

W

WALLACE, GWENDOLYN A., see Barbara C. Boyer, 315
WANG, SHIAO Y., see William B. Stickle, 303

WARREN, L., AND R. E. STEPHENS, *In vivo* vectorial labeling of scallop gill ciliary membranes by NHS-LC-biotin, 320
WATSON III, W. H., see M. A. Freadman, 386
WEINSTEIN, ANNA, RAINER VOIGT, AND JELLE ATEMA, Spectral tuning to amino acids and mixture effects on antennular chemoreceptor cells in the lobster, *Homarus americanus*, **330**
WEISSMANN, GERALD, see Giulia Celli, 317; and William Riesen, 319
What is the origin of photoreceptor noise? 321
WIDDOWS, J., R. I. E. NEWELL, AND R. MANN, Effects of hypoxia and anoxia on survival, energy metabolism and feeding of oyster larvea (*Crassostrea virginica*, Gmelin), 154
WILLIAMS, CARROLL M., see Louis Safranek, 396
WRAY, GREGORY, A., see Annette L. Parks, 96
WU, J.-Y., see D. Schiminovich, 325

Y

YAMOAH, E., see D. L. Alkon, 320
YAMOAH, EBENEZER, ALAN M. KUZIRIAN, AND CATHERINE TAMSE, Ontogeny of serotonergic neurons in *Hermissenda:* a preliminary study, 323
YOUNG, CRAIG M., see Kevin J. Eckelbarger, 230

Z

ZHENG, QIANG, AND DONALD C. CHANG, Cell fusion induced by a radio-frequency electric field, 314
ZHENG, QIANG, see Donald C. Chang, 313
ZIGMAN, SEYMOUR, KRIS LOWE, AND NANCY S. RAFFERTY, Near-UV effects on the thymidine incorporation into dogfish lens, 320
ZIGMAN, SEYMOUR, see Nancy S. Rafferty, 319